

The genus *Nemophora* Hoffmannsegg, 1798 (Lepidoptera, Adelidae) from the Ryukyus

Toshiya HIROWATARI

Entomological Laboratory, Graduate School of Life and Environmental Sciences,
Osaka Prefecture University, Sakai, Osaka, 599-8531 Japan

Abstract Seven species of the genus *Nemophora* Hoffmannsegg, 1798 are recorded from the Ryukyus, Japan, where only one species, *N. marisella* Kozlov & Hirowatari, 1997, has been known. Two new species, *N. tenuifasciata* sp. nov. and *N. pruinosa* sp. nov., are described and two species, *N. polychorda* (Meyrick, 1914) and *N. magnifica* Kozlov, 1997, are newly recorded from Japan. The male and female genitalia are illustrated except for *Nemophora optima* (Butler, 1881), which is represented by only one female specimen from Amami-Oshima Is.

Key words Lepidoptera, Adelidae, *Nemophora*, the Ryukyus, Japan.

Introduction

The genus *Nemophora* includes about 350 species world-wide, among which some 150 species remains to be described (Kozlov, 2004). In Japan, 22 species have been recorded (*cf.* Moriuti, 1982; Hirowatari, 1998; Hirowatari & Yamamoto, 2004). The Ryukyu Islands, located between Kyushu and Taiwan, are known to accommodate unique insect fauna including relict species being common with those of southern China and Taiwan or specialized to be endemic in this area. However, faunal and taxonomic study of Microlepidoptera, especially in the family Adelidae, to date has not been sufficient. In the Ryukyus, only one species *Nemophora marisella* Kozlov & Hirowatari, 1997 has been recorded, and in Taiwan, the study of Adelidae is also deficient (*cf.* Heppner, 1992; Wang *et al.*, 2000).

Comprehensive surveys in the Ryukyus during the last decade conducted by the author, colleagues and students of Osaka Prefecture University, Mr Masaaki Kimura (Okinawa) and other entomologists have accumulated considerable knowledge of *Nemophora* in this area. In the present paper, faunal information on *Nemophora* in the Ryukyus is provided with descriptions of two new species. Measurements are given for the specimens collected in the Ryukyus, and terminology follows Nielsen (1980, 1985). Unless otherwise indicated, specimens examined here are deposited in the Entomological Laboratory, Osaka Prefecture University.

Abbreviations for institutions and collections:

BMNH: The Natural History Museum, London.

USNM: National Museum of Natural History, Smithsonian Institution, Washington D. C.

OPU: Entomological Laboratory, Osaka Prefecture University, Sakai.

Key to *Nemophora* species from the Ryukyus

1. Forewing bronze without markings. Small-sized (wing expanse 11–13 mm)
..... *N. tenuifasciata* sp. nov. (part)
- Forewing with markings 2
2. Forewing with a fascia from costa to dorsum 3
- Forewing without a fascia from costa to dorsum 7

3. Fascia dark blue. Forewing metallic golden cupreous, base and both sides of fascia with bright blue scales *N. ahenea*
- Fascia not dark blue 4
4. Fascia orange yellow. Forewing yellowish brown. Large-sized (wing expanse 15–22 mm) *N. polychorda*
- Fascia white, creamy white, or indistinct 5
5. Fore- and hindwings narrow. Small-sized (wing expanse 11–13 mm). Forewing bronze. Male eyes small. Female antenna slightly thickened with smooth scales at basal 1/3 *N. tenuifasciata* sp. nov. (part)
- Fore- and hindwings relatively broad. Male eyes large. Female antenna thickened with raised scales at basal 1/2 6
6. Antenna basally smooth in male; basal half club-like in female. Small-sized (wing expanse 12–15 mm). Forewing black, scattered with pale yellow in male and white in female. Fascia margined with black *N. pruinosa* sp. nov.
- Antenna basally covered with dense raised brown scales in male; basal half uniformly thickened in female. Large-sized (wing expanse 15–19 mm). Forewing dark brown. Fascia not margined with black *N. marisella*
7. Forewing orange yellow, basal 2/3 with 4 costal and 3 dorsal silver striae margined with black. Small-sized (wing expanse 12 mm) *N. optima*
- Forewing dark brown, with pale yellow markings: basally W-shaped and costal and dorsal 2/3 triangular. Middle-sized (wing expanse 15–16 mm) *N. magnifica*

***Nemophora ahenea* Stringer (Figs 1A–B, 4, 10A–C)**

Nemophora ahenea Stringer, 1930, *Ann. Mag. nat. Hist.* (10) 6: 422. [Holotype examined] BMNH; Issiki, 1957: 13, pl. 2, fig. 30; Okano, 1959: 277, pl. 183, fig. 14; Moriuti, 1982: 1: 54, 2: pl. 1, fig. 28; Wang *et al.*, 2000: 5.

Forewing ♂ 6.3–7.2 mm, ♀ 5.8–6.0 mm. Wing expanse ♂ 13.0–15.0 mm, ♀ 12.7–13.3 mm.

Male genitalia (Fig. 4). Uncus short with a weak median keel. Vinculum moderate about 2.3× as long as valva. Valvae triangular, acutely angled apically, fused ventrally; sacculus produced anteriorly to form suspensorium for aedeagus; suspensorium triangular, anterior part slightly beyond posterior margin of vinculum in ventral view. Transtilla wide medially and narrow laterally near valva; median process short, pointed. Aedeagus long and slender, nearly straight; posterior 1/5 weakly curved dorsally; terminal part with a pair of long pointed processes ventrally; vesica dorsally with cornuti consisting of two rows of minute spines and a short median spine. Juxta arrow-shaped; arrow-head and lateral arms long and narrow, pointed.

Female genitalia (Figs 10A–C). Apophyses posteriores and anteriores long and very slender. Vestibulum entirely membranous, except attachment point of guy wire. Bursa copulatrix relatively long, membranous.

Specimens examined. Okinawa Pref., Ishigaki Is.: Omoto-dake: 1 ♀, 17. v. 1993, T. Yasunaga, 1 ♀, 6. iv. 2001, B. W. Lee, 3 ♂, 30. iii. 2002, T. Hirowatari; 1 ♂, Takeda, 15. iii. 1998 (L. T.), T. Hirowatari & T. Mano; 1 ♂, Banna-dake, 20. iii. 1999, M. Kimura; 1 ♂, Banna-koen, 7. iv. 2001, T. Ueda; 1 ♂, Maese-dake, 9. x. 2001, N. H. Ahn. Iriomote Is.: 1 ♂, Uehara, 26. iii. 2002, T. Hirowatari; 1 ♂, Funaura, 21. iii. 1995, T. Mano; 1 ♀, Sonai-dake, 28. iii. 2002 (L. T.), T. Hirowatari, N. H. Ahn, B. W. Lee, Y. Miyamoto, K. Yamada; 1 ♂, Shirahama-rindo, 26. iii. 2001, T. Saito.

Distribution. Honshu, Shikoku, Kyushu, Ryukyus (Ishigaki Is., Iriomote Is.); Taiwan.

Remarks. *Nemophora ahenea* has been known to occur on the mainland of Japan. In the present paper, it was found that this species also occurs in the Yaeyama Islands (Ishigaki Is. and Iriomote Is.), but not from the Amami and Okinawa Islands. Compared with representatives from the mainland of Japan, those from the Ryukyus are different in having 1) much larger size (wing expanse: 13–15 mm in the Ryukyus, while 11–13 mm on the mainland), 2) the forewing tinged with golden luster (purplish luster on the mainland), 3) the narrower fascia of the male forewing, and 4) female antenna with black scale tufts at base. However, there is no distinct difference in the male and female genitalia. It may be appropriate to treat representatives from the Ryukyus and Taiwan as a distinct subspecies. In Honshu, the males of this species are known to swarm (Hirowatari & Kametani, 1999), but I have not observed such behavior in the Ryukyus.

***Nemophora tenuifasciata* sp. nov.** (Figs 1C–D, 3A–B, 5, 11A–C)

Male. Forewing 5.5–6.3 mm (holotype: 5.7 mm); wing expanse 11.8–13.3 mm (holotype: 12.1 mm).

Head with raised yellow hairs, tip of some hairs pale brown; face smooth, ochreous with golden luster, laterally along eyes and dorsally near antennal socket with raised blackish brown scales. Eyes small, widely separate dorsally; horizontal eye diameter (hd)/ minimum distance between eyes in dorsal view (md): 0.6–0.7. Interocular index 0.8–0.9. Labial palpus short, $ca\ 0.9\times$ vertical eye diameter, smooth, pale yellow, sparsely mixed with brown hairs. Antenna 19.6–23.8 mm, $3.6\text{--}3.8\times$ forewing length, entirely smooth; dark bronze basally and somewhat paler apically. Legs bronze; hind tibia bronze, sparsely with long raised ochreous hairs dorsally; hind tarsus dark bronze, each tarsomere with apical white ring. Tegula and thorax (dorsum) bronze. Forewing narrow, bronze; basal 2/3 with an indistinct transverse narrow white fascia, which is sometimes absent; R_3 and R_4 separate (Fig. 3A). Hindwing dark brown; cilia dark brown.

Female. Forewing 5.1–5.6 mm; wing expanse 10.9–11.8 mm.

Head with raised yellow hairs; face smooth, pale yellow with golden luster, with raised yellow hairs laterally along eyes and dorsally near antennal socket. Eyes small, horizontal eye diameter (hd)/minimum distance between eyes (md): 0.6–0.7. Interocular index 0.7–0.8. Labial palpus short, $ca\ 1\times$ vertical eye diameter, smooth, pale yellow, mixed with brown hairs. Antenna 6.2–8.3 mm, $1.3\text{--}1.4\times$ forewing length; basal 1/3 slightly thickened with smooth dark brown scales; distal 2/3 light bronze to silvery white, smooth and slender. Tegula and thorax (dorsum) bronze. Forewing narrow, entirely bronze with no fascia; R_3 and R_4 separate (Fig. 3B). Hindwing dark brown; cilia dark brown.

Male genitalia (Fig. 5). Uncus short, with a weak median keel. Vinculum rather short about $2.0\times$ as long as valva. Valvae tongue-shaped, rounded apically, touching ventrally, suspensorium triangular; anterior part slightly beyond posterior margin of vinculum in ventral view. Transtilla very narrow medially and wide laterally near valva; median process indistinct. Aedeagus relatively short and slender, basally broad, weakly curved dorsally; manica with minute spines dorsally. Juxta arrow-shaped; arrow-head short and small, triangular, lateral arms short.

Female genitalia (Figs 11A–C). Apophyses posteriores and anteriores long and very slender. Vestibulum membranous, dorsal posterior half with U-shaped lamella. Bursa copulatrix short, membranous.

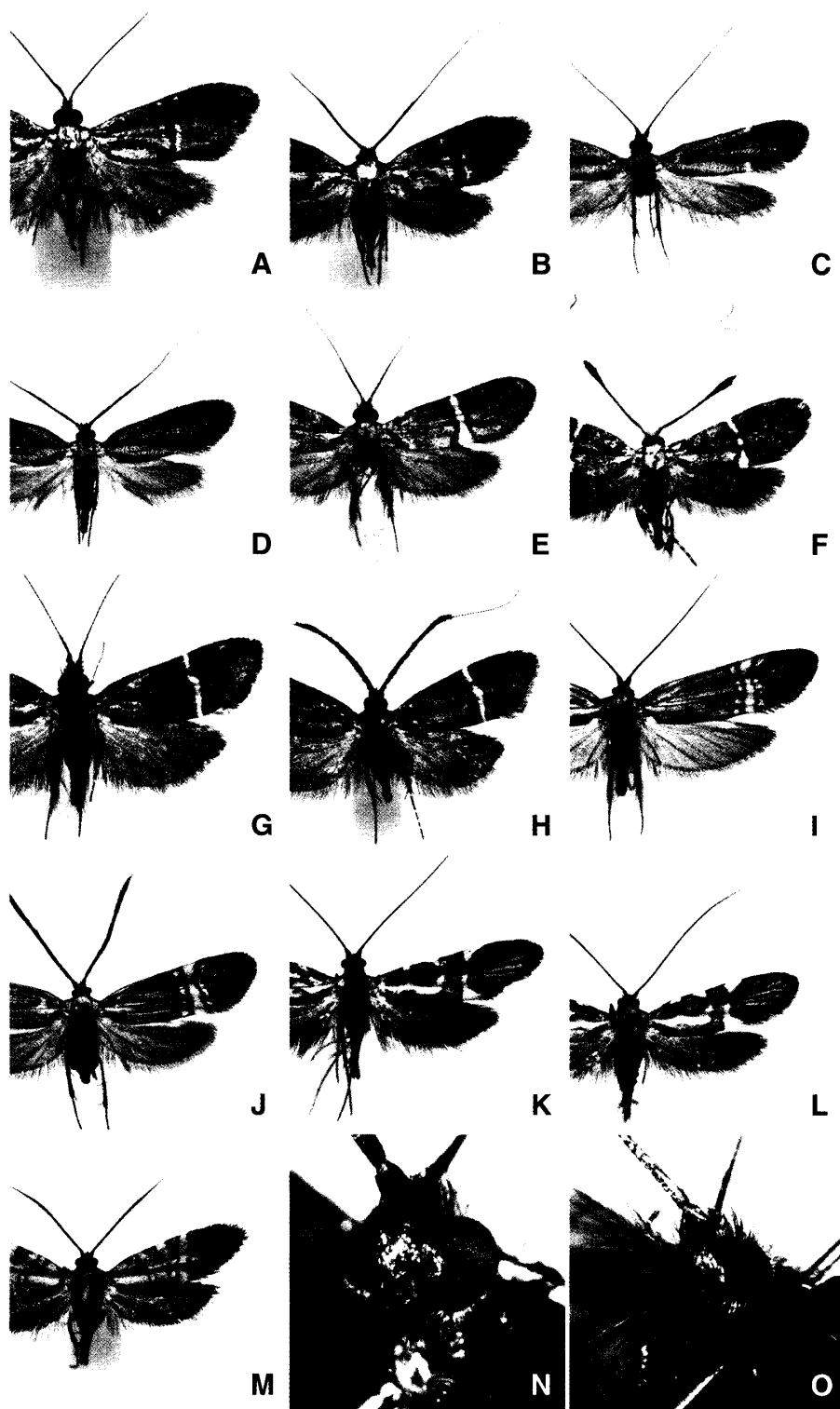


Fig. 1. Adults of *Nemophora* species from the Ryukyus (except O). A. *Nemophora ahenea* Stringer, ♂. B. *Ditto*, ♀. C. *N. tenuifasciata* sp. nov. Holotype ♂. D. *Ditto*, Paratype ♀. E. *N. pruinosa* sp. nov. Holotype ♂. F. *Ditto*, Paratype ♀. G. *N. marisella* Kozlov & Hirowatari, ♂. H. *Ditto*, ♀. I. *N. polychorda* (Meyrick), ♂. J. *Ditto*, ♀. K. *N. magnifica* Kozlov, ♂. L. *Ditto*, ♀. M. *N. optima* (Butler), ♀. N. Head of *N. pruinosa* sp. nov., ♂. O. Head of *N. umbripennis* Stringer, ♂ (from Honshu).

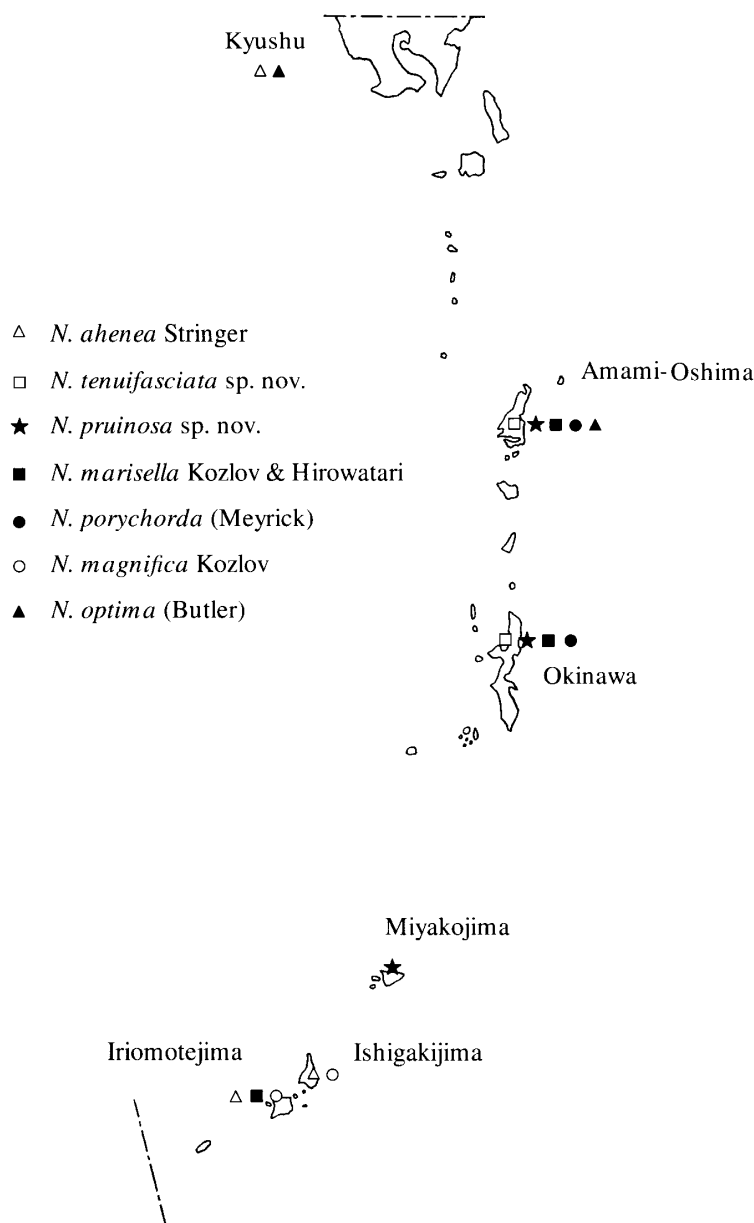


Fig. 2. Distribution of *Nemophora* species in the Ryukyus.

Holotype ♂, Amami-Oshima Is.: Hatsuno, 4. iv. 1996, T. Hirowatari. Paratypes. Okinawa Is.: Kunigami-son: 3 ♂, Yona, 19. iii. 1998, T. Hirowatari; 21 ♂ 11 ♀, Hentona, 22. iii. 2002 (L. T.), T. Hirowatari, N. H. Ahn, B. W. Lee, Y. Miyamoto, K. Yamada; 1 ♂, Hiji, 21. iii. 2002 (L. T.), T. Hirowatari *et al.*; 3 ♂, [Kushibaru, Nago], 25. iii. 2000, M. Kimura.

Distribution. Ryukyus (Amami-Oshima Is., Okinawa Is.).

Etymology. From the Latin *tenuis* (weak) and *fascia* (band), referring to the weak white band of the forewing.

Remarks. This species is the smallest among *Nemophora* species occurring in the Ryukyus. It resembles *N. aurifera* (Butler), but is easily distinguished from the latter by the smaller size, the white forewing fascia which is usually indistinct or often absent, and the shape of the male valva. The holotype specimen was collected flying over the flowers of

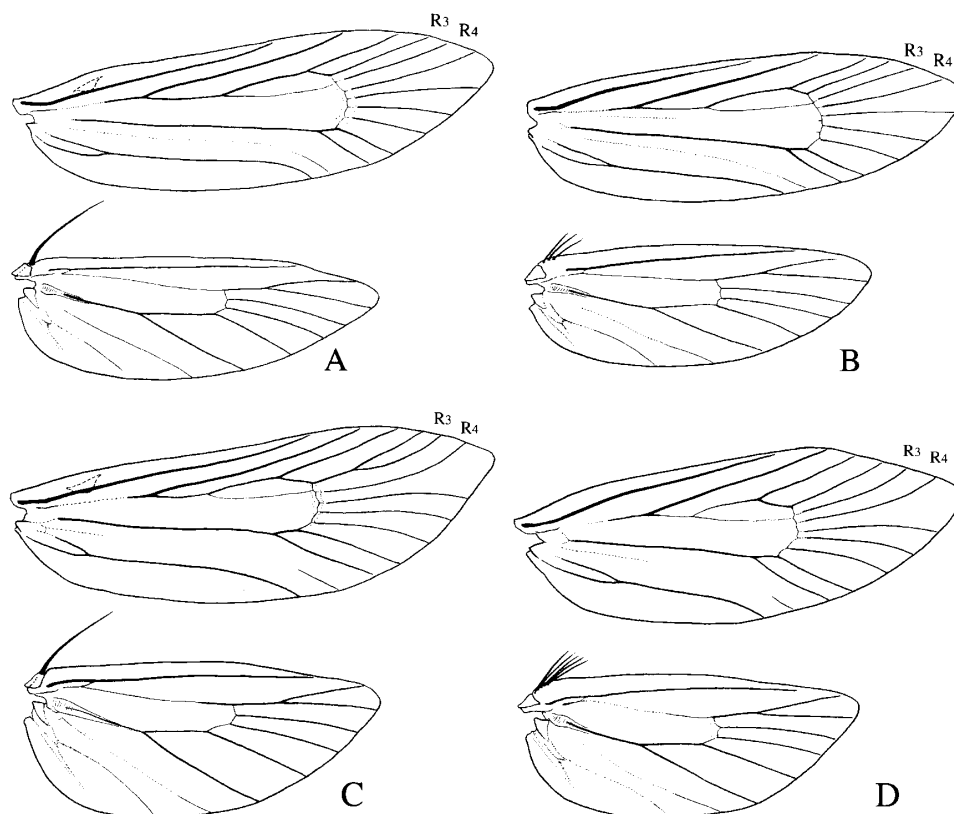


Fig. 3. Wing venation of *Nemophora* species from the Ryukyus. A. *Nemophora tenuifasciata* sp. nov., ♂. B. *Ditto*, ♀. C. *N. pruinosa* sp. nov., ♂. D. *Ditto*, ♀.

Castanopsis species on a forest trail at Hatsuno, Amami-Oshima Is. At Yona, Okinawa Is., I collected some males of this species in a similar situation. This species was seldom found in daytime, but more than 30 individuals were unexpectedly collected at a light trap run around sunset in a thundershower on March 22, 2002 at Hentona, northern Okinawa Is.

Kato (2000) recorded *N. aurifera* on *Pittosporum tobira* (Pittosporaceae) from Amami-Oshima Is. However, I could not find any specimen of *N. aurifera* from the Ryukyus, which suggests the new species or possibly *N. marisella* have been misidentified as *N. aurifera*.

***Nemophora pruinosa* sp. nov.** (Figs 1E–F, 3C–D, 6, 12A–C)

Male. Forewing 6.3–7.4 mm (holotype: 7.2 mm); wing expanse 13.2–15.8 mm (holotype: 15.0 mm).

Head with raised yellow hairs, mixed with dark brown; face smooth, broadly edged with silver scales, dorsal part near antennal socket with raised blackish brown and yellow hairs. Eyes large, swollen and approximated dorsally; horizontal eye diameter (hd)/minimum distance between eyes in dorsal view (md): 1.5–1.7. Interocular index 0.9–1.1. Labial palpus short, *ca* 0.9 × vertical eye diameter, smooth, pale yellow, mixed with brown hairs. Antenna 20.5–22.3 mm, 3.0–3.4 × forewing length, smooth; black basally with metallic blue luster, mostly silvery white. Legs bronze; hind tibia bronze, densely covered with long raised ochreous hairs dorsally; hind tarsus bronze, each tarsomere with clear apical white ring. Tegula and thorax (dorsum) bronze with golden luster. Forewing black; silvery lead-

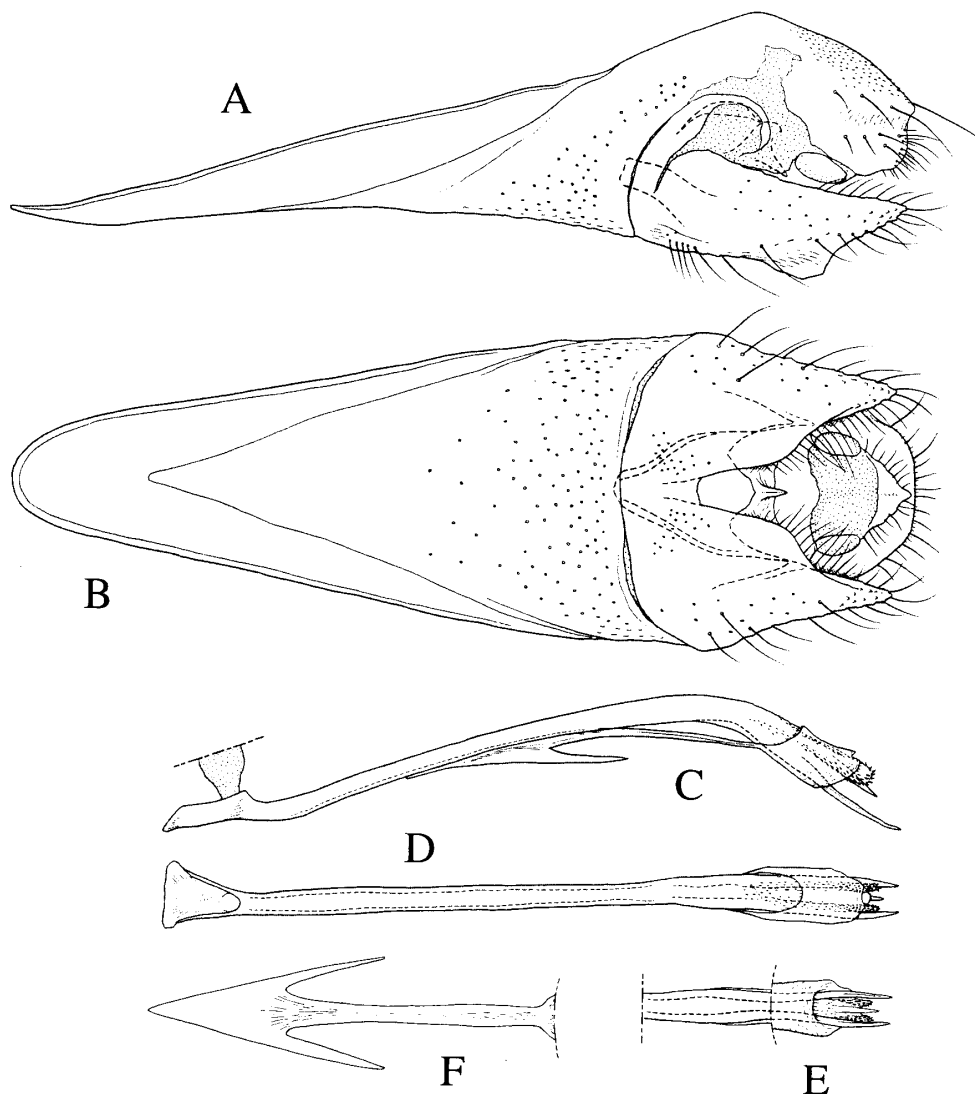


Fig. 4. Male genitalia of *Nemophora ahenea* Stringer. A. Whole genitalia except phallus (lateral view). B. *Ditto* (ventral view). C. Phallus (lateral view). D. *Ditto* (dorsal view). E. *Ditto*, posterior half (ventral view). F. Juxta (ventral view).

en scales at base; basal 1/2 with a transverse narrow creamy white fascia, margined both sides with black, and with silvery leaden scales; basal 1/3 and apical 1/3 mixed with pale yellow; R_3 and R_4 stalked (Fig. 3C). Hindwing dark brown; cilia dark brown.

Female. Forewing 5.7–6.2 mm; wing expanse 12.3–13.5 mm.

Head with raised pale yellow hairs, mixed with dark brown as in male. Eyes small, horizontal eye diameter (hd)/minimum distance between eyes (md): 0.5–0.6. Interocular index 0.7–0.8. Labial palpus *ca* $1.5 \times$ vertical eye diameter, pale yellow, sparsely mixed with brown hairs. Antenna 7.5–8.5 mm, $1.3\text{--}1.4 \times$ forewing length; basal 1/2 thickened with dark bronze, club-like; distal 1/2 silvery white, smooth and slender. Tegula and thorax (dorsum) silvery bronze. Wing as in male, but forewing much darker, median fascia and scattered scales clear white, and forewing R_3 and R_4 separate (Fig. 3D).

Male genitalia (Fig. 6). Uncus short with a weak median keel. Vinculum moderate about

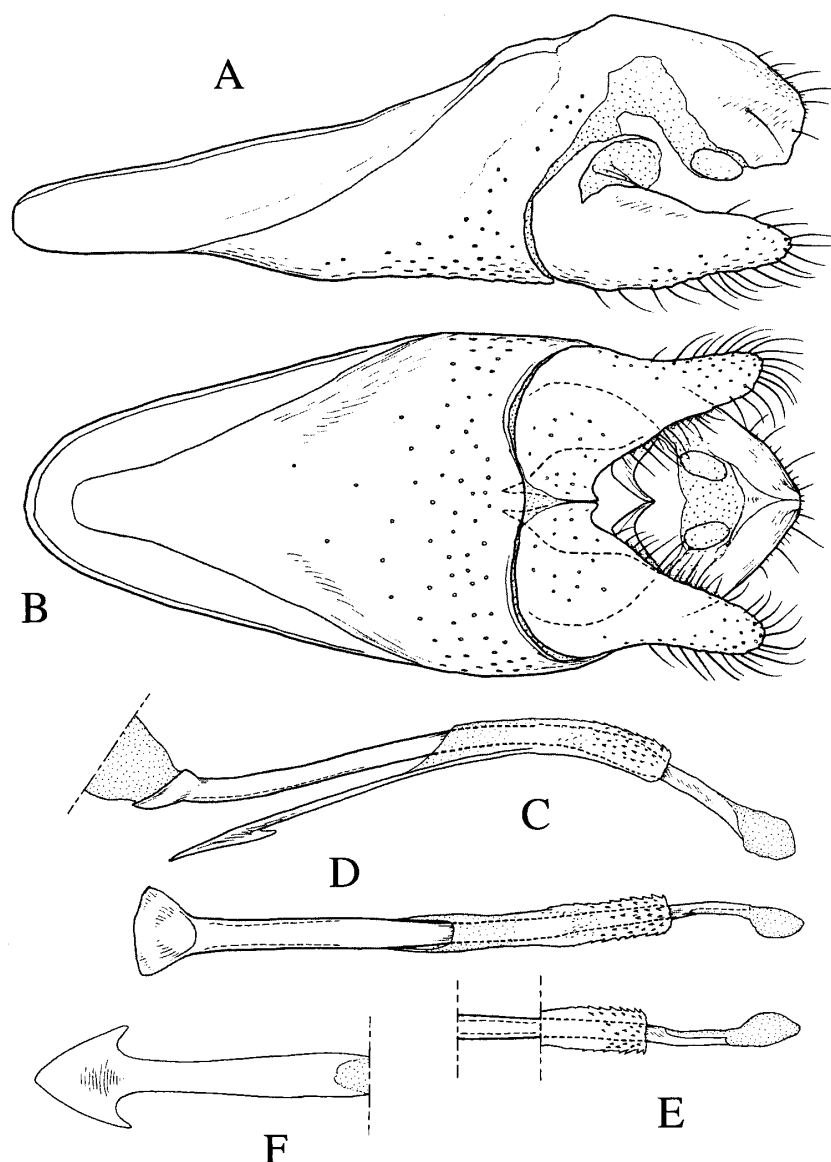


Fig. 5. Male genitalia of *Nemophora tenuifasciata* sp. nov. (Holotype). A. Whole genitalia except phallus (lateral view). B. *Ditto* (ventral view). C. Phallus (lateral view). D. *Ditto* (dorsal view). E. *Ditto*, posterior half (ventral view). F. Juxta (ventral view).

2.4× as long as valva. Valvae triangular, acutely angled apically, separated ventrally; sacculus basally swollen with dense hairs; suspensorium triangular, anterior part slightly beyond posterior margin of vinculum in ventral view. Transtilla wide in median and lateral parts; median process long, pointed. Aedeagus moderate in length, slender; basal 2/3 weakly curved dorsally; apical portion with a weak lamellate keel dorsally; manica with a patch of minute spines dorsally. Juxta arrow-shaped; arrow-head large, lateral arms moderate.

Female genitalia (Figs 12A–C). Apophyses posteriores and anteriores long and slender. Vestibulum membranous, except attachment point of guiwire. Bursa copulatrix short, membranous.

Holotype ♂, Amami-Oshima Is.: Hatsuno, 6. iv. 1996, T. Hirowatari. Paratypes. 2 ♂, same data as holotype; 1 ♂, 4. iv. 1996, same locality and collector; 1 ♀, Yuwandake, 19. vi.

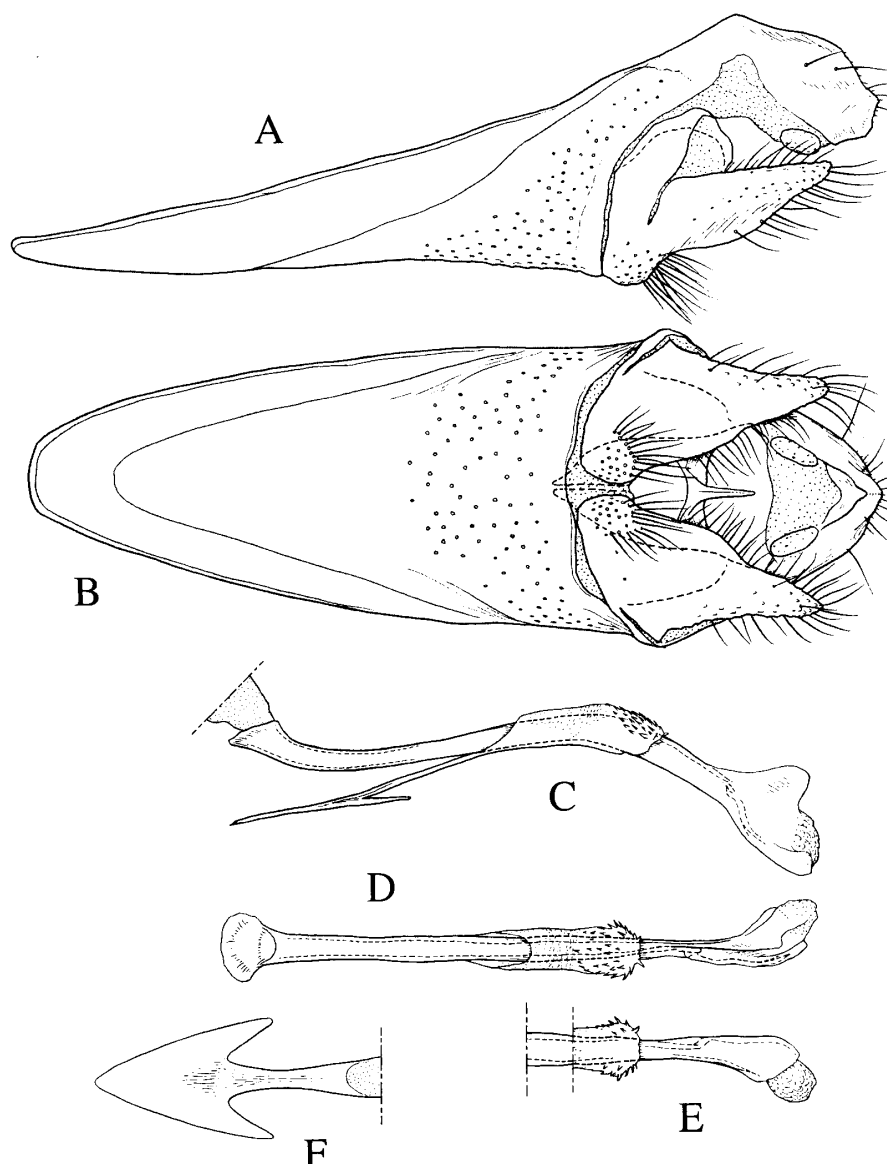


Fig. 6. Male genitalia of *Nemophora pruinosa* sp. nov. (Holotype). A. Whole genitalia except phallus (lateral view). B. *Ditto* (ventral view). C. Phallus (lateral view). D. *Ditto* (dorsal view). E. *Ditto*, posterior half (ventral view). F. Juxta (ventral view).

1995, Y. Sawada; 3 ♂, Ogami-yama, Naze-shi, 11. vi. 1986, Y. Arita. Okinawa Pref., Okinawa Is.: Kunigami-son: 1 ♀, Benoki[gawa], 13. v. 1998, T. Ueda; Yona: 1 ♀, 21. iv. 1962, Y. Arita, 2 ♂, 9. iv. 1996, T. Hirowatari, Y. Nakatani, 2 ♂ 1 ♀, 9–13. iv. 1997, T. Ueda, 1 ♂ 1 ♀, 15–18. v. 1998, T. Ueda; Hentona: 1 ♂, Kunigami, 31. iii. 2001, B.W. Lee, 4 ♂ 1 ♀, 22. iii. 2002 (L. T.), T. Hirowatari, N. H. Ahn, B. W. Lee, Y. Miyamoto, K. Yamada; 1 ♀, Ohkuni-rindo, 14. v. 1998, T. Ueda; 1 ♀, Hiji-Ohashi, 19. v. 1998, T. Ueda; 3 ♂, [Egairindo, Ogimi-son], 8. v. 2000, M. Kimura; 2 ♂, Motobu, Izumi, 10. v. 1980, E. Nishida; 1 ♂, Nagodake, Nago, 15. v. 1998, Y. Sawada; 2 ♂, Itoman, 1. iv. 1999, Y. Sakuratani; 1 ♀, [Maehira, Itoman], 20. iv. 2000, M. Kimura; Miyako Is.: 1 ♂, Karimata, 11. iii. 1979, S. Tsukaguchi; 1 ♂, [Uipya, Gusukube-cho], 11. iv. 2000, M. Kimura.

Distribution. Ryukyus (Amami-Oshima Is., Okinawa Is., Miyako Is.).

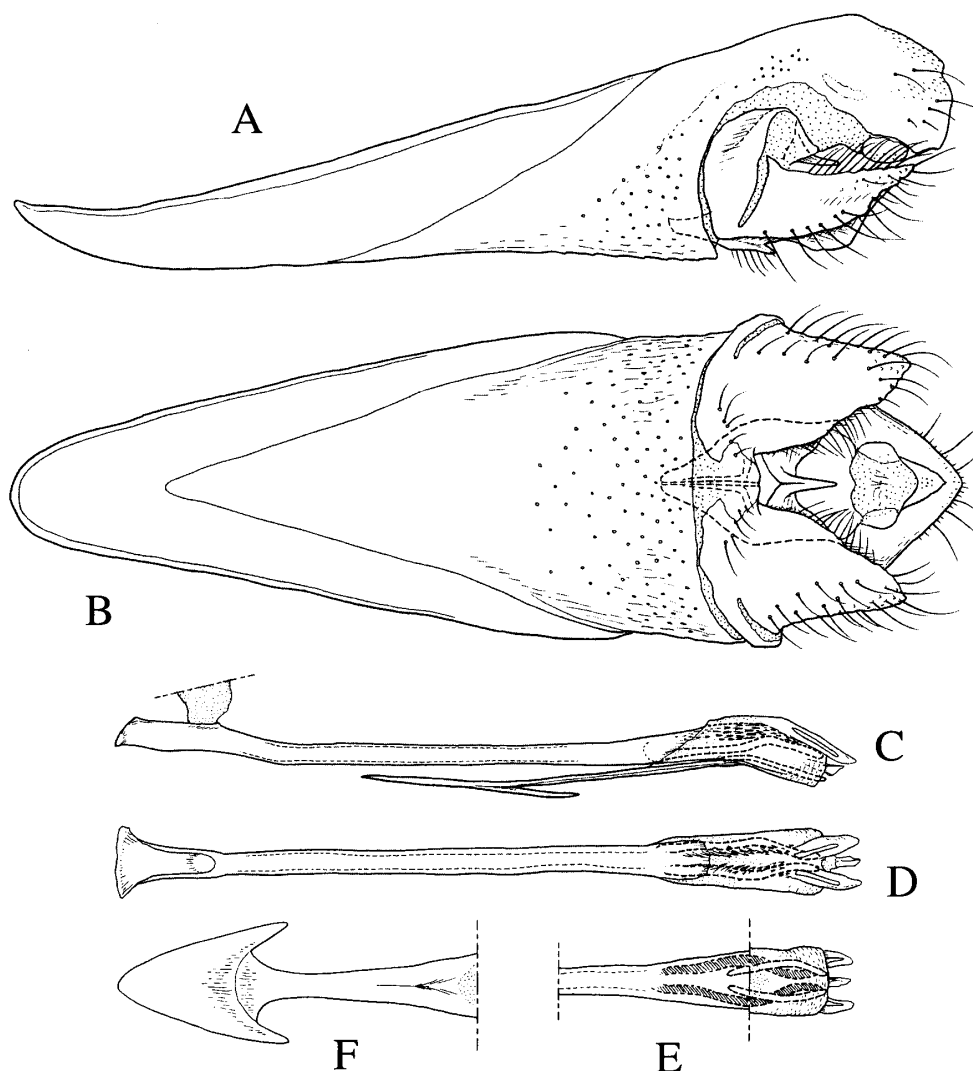


Fig. 7. Male genitalia of *Nemophora marisella* Kozlov & Hirowatari. A. Whole genitalia except phallus (lateral view). B. *Ditto* (ventral view). C. Phallus (lateral view). D. *Ditto* (dorsal view). E. *Ditto*, posterior half (ventral view). F. Juxta (ventral view).

Etymology. From the Latin *pruinosa* (covered with hoarfrost), referring to the pale yellow or white scales covering the forewing.

Remarks. This species is superficially similar to *N. umbripennis* Stringer, but is easily distinguished from it by the labial palpus being scarcely ornamented with short hairs (Fig. 1N), while it is densely covered with long hairs in *N. umbripennis* (Fig. 1O). I collected some males flying over the flowers of *Castanopsis* species, with *N. tenuifasciata* sp. nov. and *N. marisella* in Amami-Oshima Is. and Okinawa Is.

Kato (2000) recorded *N. umbripennis* on *Cinnamomum doederleinii* (Lauraceae) from Amami-Oshima Is., but the new species seems to have been misidentified as *N. umbripennis* because the latter is not distributed in the Ryukyus. The new species usually has raised yellow hairs mixed with dark brown on the head, but two males from Miyako Is. have uniformly orange hairs on the head. I included them in the paratypes because no difference was recognized in the male genitalia.

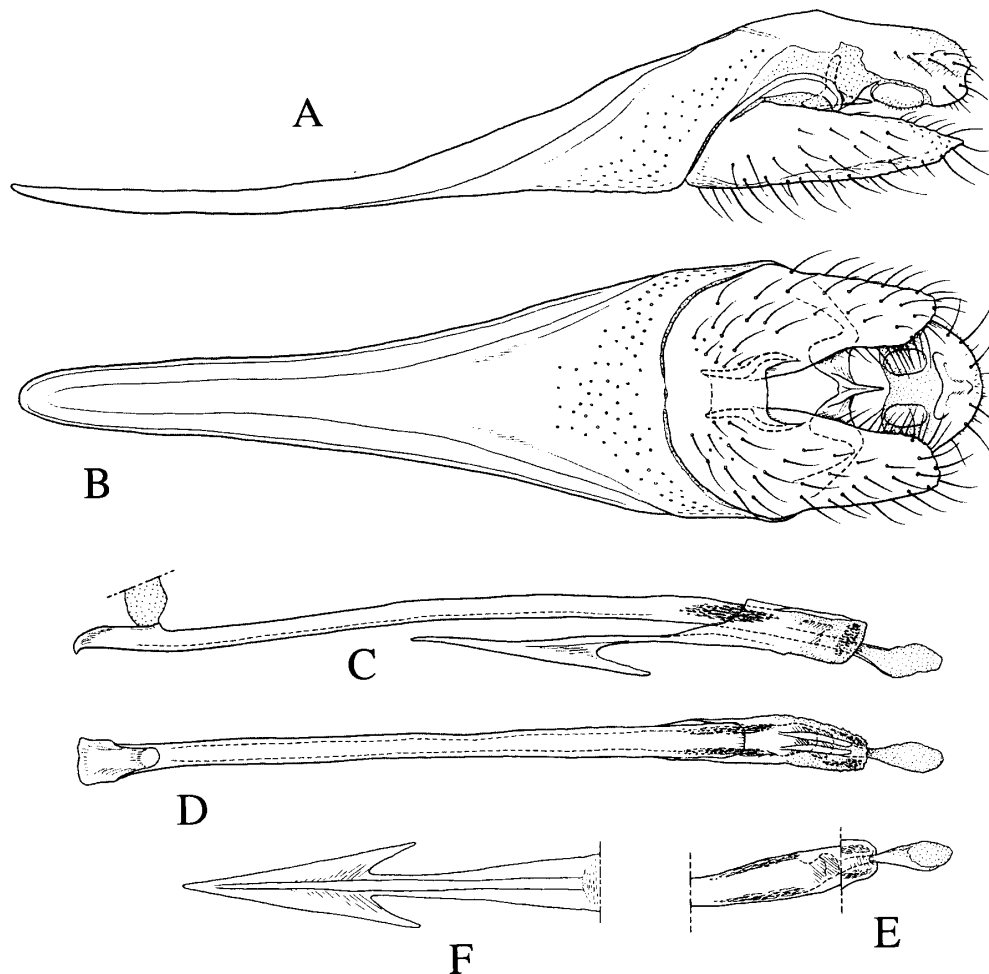


Fig. 8. Male genitalia of *Nemophora polychorda* (Meyrick). A. Whole genitalia except phallus (lateral view). B. *Ditto* (ventral view). C. Phallus (lateral view). D. *Ditto* (dorsal view). E. *Ditto*, posterior half (ventral view). F. Juxta (ventral view).

***Nemophora marisella* Kozlov & Hirowatari (Figs 1G–H, 7, 13A–C)**

Nemophora marisella Kozlov & Hirowatari, 1997, *Entomologica scand.* **28**: 87–96, figs 2, 3, 6, 11, 18–22. [Holotype examined] OPU.

Forewing ♂ 6.7–8.7 mm, ♀ 6.6–8.4 mm. Wing expanse ♂ 14.4–19.0 mm, ♀ 14.9–18.2 mm.

Male genitalia (Fig. 7). Uncus short, with a distinct median keel. Vinculum very long about $3.4\times$ as long as valva. Valvae short, triangular, acutely angled apically, separated ventrally; suspensorium triangular, anterior part beyond posterior margin of vinculum in ventral view. Transtilla wide in median and lateral parts; median process moderate, pointed. Aedeagus long and slender; posterior part with a pair of short linear lamellae ventrally; vesica with two rows of spine-like cornuti and a pair of sinuate rods dorsally; manica with a pair of lamellate processes dorsally. Juxta arrow-shaped; arrow-head moderate in size, triangular, lateral arms short.

Female genitalia (Figs 13A–C). Apophyses posteriores and anteriores long and relatively stout. Vestibulum membranous, dorsally with shield-like trapezoid lamella, posterior 1/3

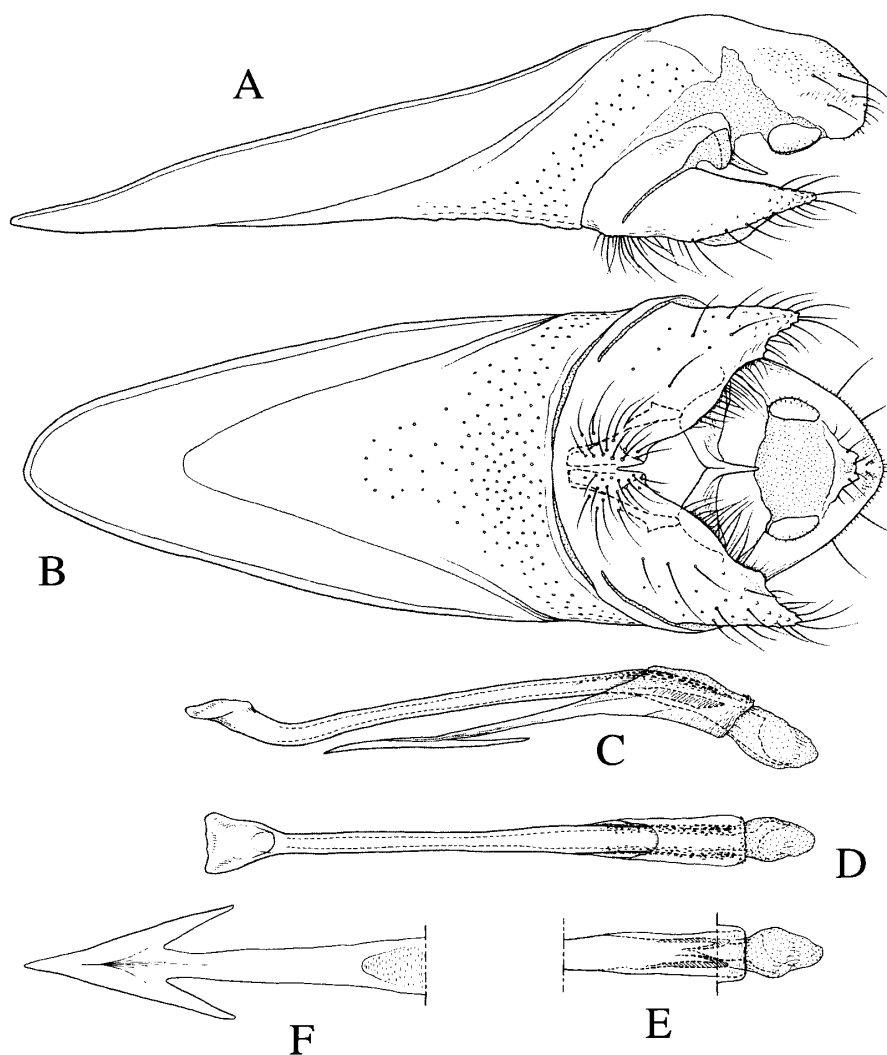


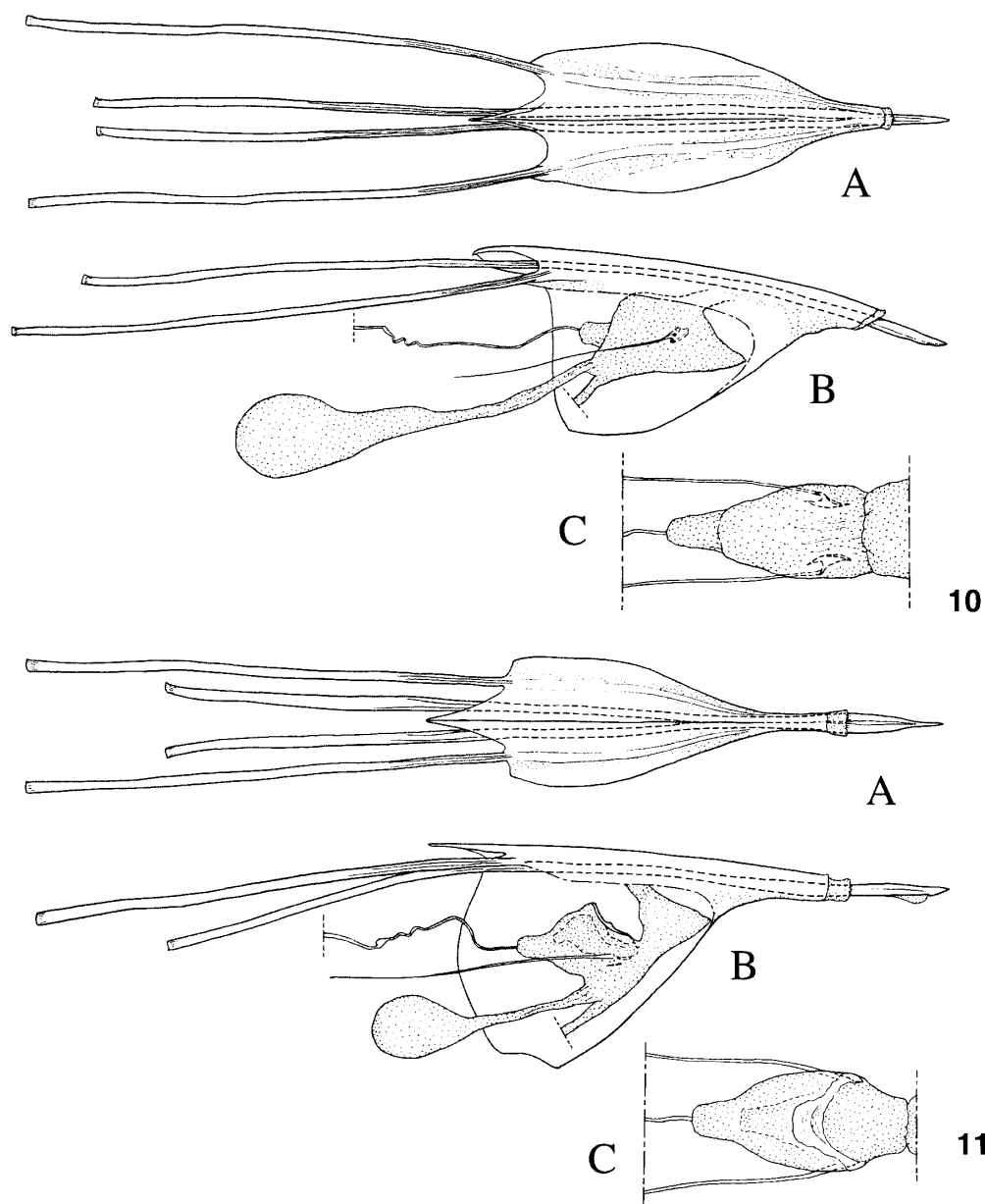
Fig. 9. Male genitalia of *Nemophora magnifica* Kozlov. A. Whole genitalia except phallus (lateral view). B. Ditto (ventral view). C. Phallus (lateral view). D. Ditto (dorsal view). E. Ditto, posterior half (ventral view). F. Juxta (ventral view).

concave. Bursa copulatrix short, membranous.

Specimens examined. Kagoshima Pref., Amami-Oshima Is.: Higashinakama: 1 ♂ 1 ♀ (♂ holotype), 29. iii. 1963, Y. Arita; 1 ♂, 31. iii. 1963, Y. Arita; Hatsuno: 1 ♀, 4. iv. 1963, Y. Arita, 1 ♀, 16. iv. 1963, N. Ohbayashi; 1 ♀, Yuidake, 26. iii. 2002, Sugisima. Okinawa Pref., Okinawa Is.: Kunigami-son: Yona, 1 ♂ 1 ♀, 19–20. iii. 1998, T. Hirowatari; 1 ♀, 24. iii. 2002 (L. T.), T. Hirowatari, N. H. Ahn, B. W. Lee, Y. Miyamoto, K. Yamada; 2 ♂, Hentona, 22. iii. 2002 (L. T.), T. Hirowatari *et al.*; 1 ♀, Okuni-rindo, 25. iii. 2002 (L. T.), T. Hirowatari *et al.*; 1 ♂ 1 ♀, Hiji, 21. iii. 2002 (L. T.), T. Hirowatari *et al.*; 3 ♂, Mt Yonaha, 20. iii. 1995, T. Mano, B. Tanaka; 1 ♀, Mt Tamatsuji, Ogimi-son, 25. iii. 2000, M. Kimura; Iriomote Is.: 1 ♂, Uehara, 4. x. 2001 (larva), T. Saito, emerged 28. xii. 2001; 1 ♂ 1 ♀, same data, emerged 25–27. xii. 2001.

Distribution. Ryukyus (Amami-Oshima Is., Okinawa Is., Iriomote Is.).

Remarks. This species was described based on specimens from Amami-Oshima Is. (Kozlov

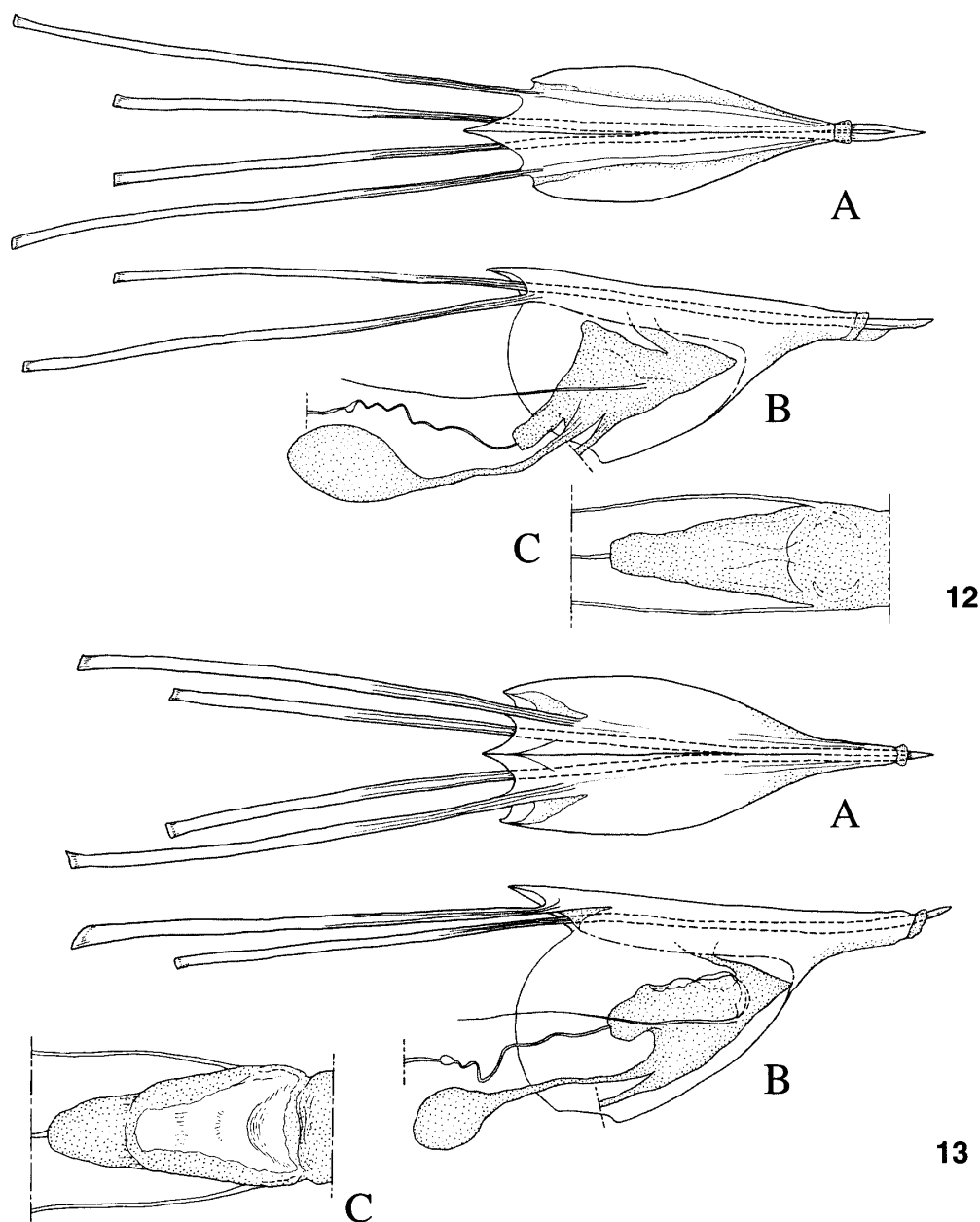


Figs 10–11. Female genitalia of *Nemophora* species. 10. *N. ahenea* Stringer. 11. *N. tenuifasciata* sp. nov. A. Terminalia (dorsal view). B. *Ditto* (lateral view). C. Vestibulum (dorsal view).

& Hirowatari, 1997). In preparing this paper, I obtained additional specimens from Okinawa Is. and also from Iriomote Is. The specimens from Iriomote Is. were reared from larvae collected by Dr Toshihisa Saito in 2001, and they are rather smaller (wing expanse: 2 ♂ 14.4, 14.7 mm, 1 ♀ 14.9 mm) and with a paler forewing than those from Amami-Oshima and Okinawa Is. In addition, the fascia of the forewing is indistinct in the two males, while it is distinct in the female. It is not clear whether these differences are attributable to geographic or individual variation.

***Nemophora polychorda* (Meyrick) (Figs 11–J, 8, 14A–C)**

Nemotois polychorda Meyrick, 1914, *Supplta ent.* (3): 61. [Holotype examined] BMNH.

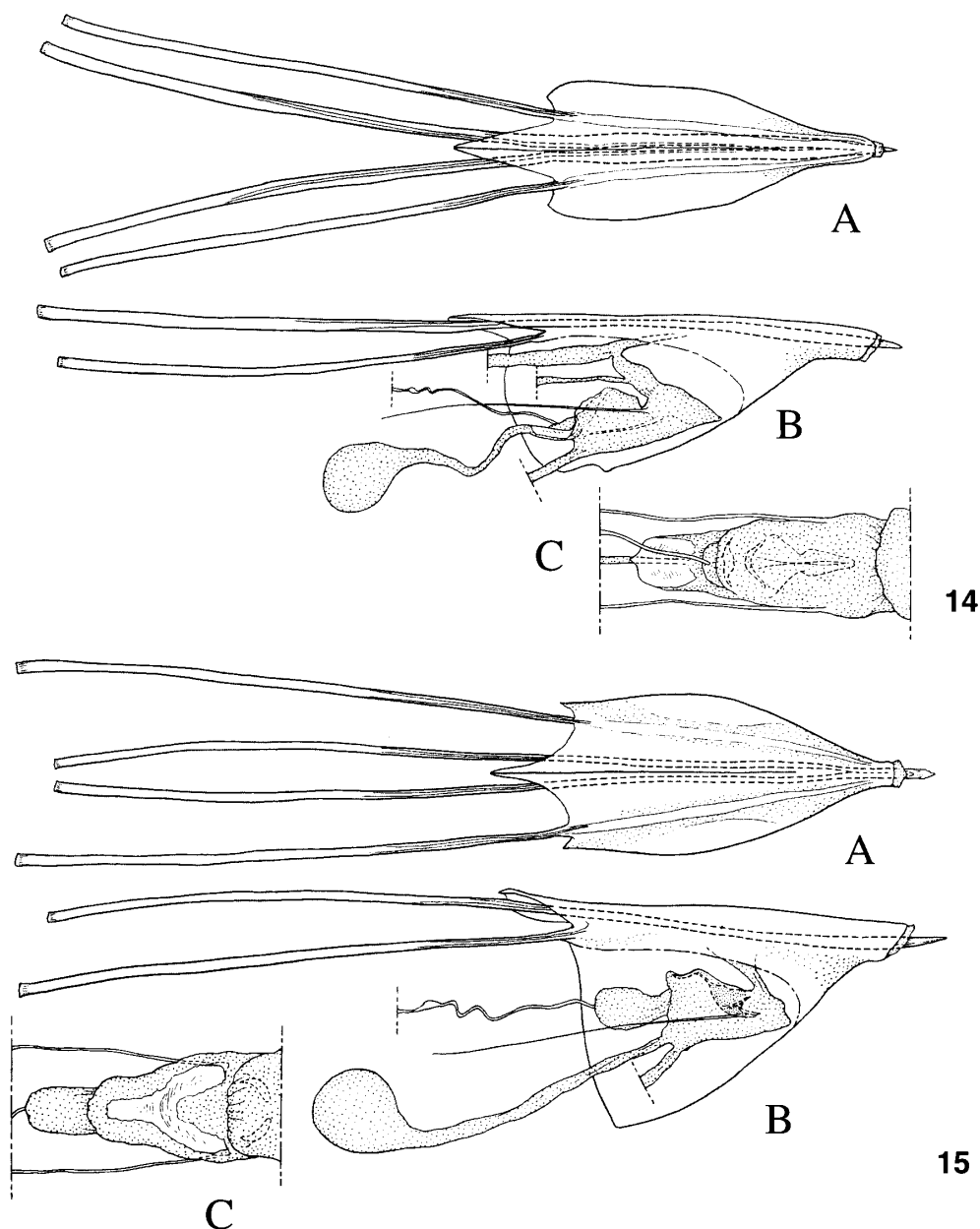


Figs 12–13. Female genitalia of *Nemophora* species. 12. *N. pruinosa* sp. nov. 13. *N. marisella* Kozlov & Hirowatari. A. Terminalia (dorsal view). B. *Ditto* (lateral view). C. Vestibulum (dorsal view).

Nemophora polychorda: Matsumura, 1931: 1112; Matsumura, 1932: 126, pl. 4, fig. 19; Heppner, 1992: 63; Wang *et al.*, 2000: 13–14.

Forewing ♂ 9.7–10.5 mm, ♀ 7.4–8.5 mm. Wing expanse ♂ 20.2–22.1 mm, ♀ 15.3–18.0 mm.

Male genitalia (Fig. 8). Uncus short, with a weak median keel. Vinculum moderate about 2.4× as long as valva, anterior half distinctly narrow. Valvae spatulate, blunt apically, fused ventrally; sacculus basally flattened; suspensorium quadrate, anterior part not reaching posterior margin of vinculum in ventral view. Transtilla wide medially and very narrow lateral-



Figs 14–15. Female genitalia of *Nemophora* species. 14. *N. polychorda* (Meyrick). 15. *N. magnifica* Kozlov. A. Terminalia (dorsal view). B. *Ditto* (lateral view). C. Vestibulum (dorsal view).

ly near valva; median process moderate, pointed. Aedeagus long and slender, nearly straight; vesica with two short rows of minute spine-like cornuti dorsally; manica with a pair of short narrow lamellae dorsally. Juxta arrow-shaped; arrow-head and lateral arms long and narrow, pointed.

Female genitalia (Figs 14A–C). Apophyses posteriores and anteriores long and slender. Vestibulum membranous, except internal weakly sclerotized lamella. Bursa copulatrix short, membranous; base of corpus bursae broad and dorsally sclerotized.

Specimens examined. Kagoshima Pref., Amami-Oshima Is.: 1 ♀, Chuo-rindo, (Uken), 30.

iv. 1998, T. Saito; Hatsuno: 1 ♂, 30. iii. 1964, G. Miyake; 36 ♂ 2 ♀, 4–6. iv. 1996, T. Hirowatari; 1 ♂, Yui-dake, 26. iii. 2002 (L. T.), K. Sugisima. Okinawa Pref., Okinawa Is.: Kunigami-son: 3 ♂ 1 ♀, [Nishime-dake], 1. iv. 2000, M. Kimura; 5 ♂, Yona, Yona-gawa, 24. iii. 1997, O. S. Flint, USNM; 2 ♂ 1 ♀, Yona, mid Yona-gawa, 26–29. iii. 1997, O. S. Flint, USNM; Yona: 3 ♂ 2 ♀, 9. iv. 1996, T. Hirowatari; 2 ♂ 2 ♀, 10–11. iv. 1997, T. Ueda; 8 ♂ 2 ♀, 19. iii. 1998, T. Hirowatari; Hentona: 15 ♂ 12 ♀, 22. iii. 2002 (L. T.), T. Hirowatari, N. H. Ahn, B. W. Lee, Y. Miyamoto, K. Yamada; 2 ♂, 2. iv. 2001, B. W. Lee; 1 ♀, Okuma, 10. iv. 1997, T. Ueda; Yonaha-dake: 1 ♀, 28. iii. 1987, H. Yoshimoto; 9 ♂ 1 ♀, 8. iv. 1996, T. Hirowatari, M. Aoyagi, Y. Nakatani, T. Ueda; 1 ♂, 20. iii. 1995, T. Mano. Ogimi-son: 1 ♂ 1 ♀, [Egai-rindo], 1–4. iii. 2000, M. Kimura; 1 ♂, [Oshikawa], 25. iii. 1999, S. Tanaka; [Tamatsuji-yama]: 4 ♂ 2 ♀, 25. iii. 2000, M. Kimura, 1 ♀, 22. iii. 2002, T. Hirowatari; 1 ♂ 1 ♀, [Kushibaru, Nago], 25. iii. 2000, M. Kimura. 1 ♂, Ikehara, Okinawa City, 11. iii. 1999, M. Kimura; 4 ♂, Izumi, 22. iii. 1964, T. Shirôzu.

Distribution. Ryukyus (Amami-Oshima Is., Okinawa Is.).

Remarks. Representatives from Taiwan, where this species was originally described, are very large, the wingspan being 25–30 mm in male (Wang *et al.*, 2000), but those from the Ryukyus are relatively smaller. This species is rather common in Amami-Oshima Is. and Okinawa Is., and the males were observed swarming over or around various kinds of trees.

Nemophora magnifica Kozlov (Figs 1K–L, 9, 15A–C)

Nemophora magnifica Kozlov, 1997, *Dt. ent. Z.* **44**: 137–145, figs 3, 4, 7, 18–22. [Holotype examined] NMNH.

Nemophora magnifica: Wang *et al.*, 2000: 25.

Forewing ♂ 6.8–7.4 mm, ♀ 6.9–7.3 mm. Wing expanse ♂ 15.0–15.4 mm, ♀ 14.8–15.6 mm.

Male genitalia (Fig. 9). Uncus short, with a distinct median keel. Vinculum moderate about 2.3× as long as valva. Valvae triangular, acutely angled apically, fused ventrally; sacculus basally flattened with dense hairs; suspensorium trapezoid, anterior part not reaching posterior margin of vinculum in ventral view. Transtilla wide in median and lateral parts; median process moderate, pointed. Aedeagus relatively short and slender; basal portion curved ventrally; vesica with two rows of spine-like cornuti dorsally. Juxta arrow-shaped; arrow-head long and narrow, lateral arms short, pointed.

Female genitalia (Figs 15A–C). Apophyses posteriores and anteriores long and very slender. Vestibulum membranous, dorsally with Y-shaped lamella. Bursa copulatrix long, membranous.

Specimens examined. Okinawa Pref., Ishigaki Is.: Busama-dake: 2 ♂ 1 ♀, 21. iii. 1981, Y. Arita, 1 ♂, 27. iii. 2000, M. Kimura; Mt Omoto: 1 ♀, 2. iv. 1980, K. Yasuda, 1 ♀, 6. iv. 2001, B. W. Lee; 1 ♂, Takeda, 15. iii. 1998 (L. T.), T. Hirowatari & T. Mano; 1 ♂ 2 ♀, Banna-dake, 20. iii. 1999, M. Kimura. Iriomote Is.: 1 ♂, Urauchigawa, 26. iii. 1993, T. Mano.

Distribution. Ryukyus (Ishigaki Is., Iriomote Is.); Taiwan.

Remarks. Kozlov (1997) described this species from Taiwan placing it in the *divina* species group, with *N. divina* (Caradja, 1939) from Shansi, China, and *N. assamensis* Kozlov, 1997 from Assam, India. He characterized the group by the following male genital characters and other external ones: 1) apical part of aedeagus formed by the left wall only which forms

a broad lobe, and 2) anellus with pair of articulated carinae at base of juxta. Kozlov (1997) also noted that the range of wing expanse in *N. magnifica* from Taiwan is 18–21 mm in the male and 15.0–15.5 mm in the female. However, the males collected in the Ryukyus are apparently smaller than those from Taiwan, the wing expanse being 15.0–15.4 mm in the male.

Nemophora optima (Butler) (Fig. 1M)

Adela optima Butler, 1878, *Illustr. typical Specimens Lepid. Heterocera Colln Br. Mus.* 2: 62, pl. 40: 6. [Holotype examined] BMNH.

Nemotois optima: Meyrick, 1912: 9; Matsumura, 1932: 126.

Nemophora optima: Kuroko, 1961: 49, pl. 5; Moriuti, 1982: 1: 55, 2: pl. 1, fig. 34.

Forewing ♂ 6.0 mm. Wing expanse ♀ 12.2 mm.

Specimen examined. Kagoshima Pref., Amami-Oshima Is.: 1 ♀, Ogami-yama, Naze-shi, 11. vi. 1986, Y. Arita.

Distribution. Hokkaido, Honshu, Kyushu, Ryukyus (Amami-Oshima Is.).

Remarks. Only one female specimen, which has a darker forewing than specimens from Honshu, has been collected from Amami-Oshima Is. This species is very rare and scarcely collected in the mainland of Japan. The male and female genitalia of *N. optima* were illustrated by Kuroko (1961).

Acknowledgments

I wish to express my cordial thanks to Mikhail Kozlov (University of Turku, Turku), for valuable information on Japanese Adelidae. I am also indebted to the following entomologists for their kind help and for valuable specimens: Yutaka Arita (Meijo University, Nagoya), Donald Davis (USNM), Masaaki Kimura (Naha, Okinawa), Takahiro Mano (Toyota Yahagi River Institute, Toyota), Yukinobu Nakatani (National Institute for Agro-Environmental Sciences, Tsukuba), Toshihisa Saito (Ikeda, Osaka), Kevin Tuck (BMNH), Kazuhiro Sugisima and Yoshihiro Sawada (Hokkaido University, Sapporo), Tatsuya Ueda (Chiiki-Kankyo-Keikaku Co., Takatsuki), Neung-ho Ahn, Bon-Woo Lee, and Kazutaka Yamada (OPU). I thank the staff of the Yona Field, Subtropical Field Science Center, Faculty of Agriculture, and the Iriomote Station, Tropical Biosphere Research Center, University of the Ryukyus, for providing the use of fields and facilities.

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摘 要

琉球列島のウスベニヒゲナガ属 (鱗翅目, ヒゲナガガ科) (広渡俊哉)

ウスベニヒゲナガ *Nemophora* 属は, 全世界に約 350 種 (そのうち 150 種は未記載種) が分布するとされている。日本では 22 種が知られているが, 琉球列島からはアマミヒゲナガ *N. marisella* Kozlov & Hirowatari, 1997 の 1 種が知られるのみで, 研究は不十分だった。

著者や大阪府立大学関係者, 沖縄の木村正明氏らが採集した材料を中心に検討を行った結果, 琉球列島産のウスベニヒゲナガ属に 2 新種 2 日本新記録種を含む 7 種を認めた。ヒゲナガガの成虫は主に昼間にシイ類の花などに集まるものを採集したが, 灯火採集でも多くの個体が得られた。特に, 2002 年 3 月 22 日に沖縄本島北部の辺土名で木村氏らと日没直後の雷雨の中で行った灯火採集では, 沖縄本島に分布する 4 種が合計 70 個体以上も飛来した。本稿では奄美大島で 1 ♀のみが採集されたギンスジヒゲナガを除いて, 各種の雌雄交尾器を図示・記載した。以下は, 琉球列島産ウスベニヒゲナガ属 7 種の特徴, 分布などの概要である。

1. *Nemophora ahenea* Stringer コンオビヒゲナガ (琉球列島新記録) (Figs 1A–B, 4, 10A–C)

中型 (開張 13–15 mm)。前翅は金色の光沢を帯びた赤銅–赤紫色で, 細い濃紺色の帯をもつ。前翅前縁基部と帯の両側は明るい青色の鱗粉で縁取られる。本種は琉球列島では八重山諸島 (石垣島, 西表島) で採集されているが, 奄美・沖縄諸島では発見されていない。本土産 (開張 11–13 mm) と比べてやや大型で, 前翅は金色の光沢が強い (本土産は紫色の光沢が強い), ♂前翅の紺色の帯が狭い, ♀の触角基部に黒色の鱗粉束をもつ, などの点で異なっているが, 交尾器の形態には顕著な差異は認められなかった。なお, 本州では♂が群飛することが知られているが, 琉球では群飛を観察していない。

分布: 本州, 九州, 琉球 (石垣島, 西表島); 台湾。

2. *Nemophora tenuifasciata* sp. nov. ウソビコヒゲナガ (新種) (Figs 1C–D, 3A–B, 5, 11A–C)

琉球列島産の本属中もっとも小型 (開張 11–13 mm)。頭頂部は♂♀ともに黄色。前後翅ともに細長い。前翅は弱い光沢がある淡褐色。前翅の白帯は不明瞭で変異が大きく, 白帯をまったく欠く個体も多い。ホソオビヒゲナガ *N. aurifera* (Butler) に似るが, 小型であること, 前翅の白帯が不明瞭, 交尾器のバルバ

の形状など区別できる。シイ類の花で吸蜜、あるいは花の上を飛翔している成虫を採集した。

分布: 琉球 (奄美大島, 沖縄本島)。

3. *Nemophora pruinosa* sp. nov. リュウキュウクロヒゲナガ (新種) (Figs 1E-F, 3C-D, 6, 12A-C)

小-中型 (開張 12-15 mm) で, 前翅の地色は黒色で♂では淡黄色, ♀では白色の鱗粉が散布される。白帯の両側は黒色, さらにその外側は鈍い光沢のある鉛色の鱗粉で縁取られる。キオビクロヒゲナガ *N. umbripennis* Stringer に似るが, 本種では♂の下唇鬚が短く短毛がまばらに生じる (Fig. 1N) のに対して, キオビクロヒゲナガでは♂の下唇鬚は長く長毛で蜜に覆われる (Fig. 1O) 他, 交尾器の形態も異なる。♂成虫は, シイ類などの樹冠部の上空で群飛していた。

分布: 琉球 (奄美大島, 沖縄本島, 宮古島)。

4. *Nemophora marisella* Kozlov & Hirowatari アマミヒゲナガ (Figs 1G-H, 7, 13A-C)

中-大型 (開張 14-19 mm)。♂では触角基部, ♀では触角の基半部が黒色鱗で覆われる。前後翅ともに幅広く, 前翅は光沢のない黒褐色で, 白帯は細い。奄美大島産に基づいて記載されたが, 沖縄本島, 八重山諸島 (西表島) にも分布することを確認した。西表島産は, 齊藤寿久博士が採集した幼虫を飼育・羽化させたもので, 奄美・沖縄産に比べて小型 (開張♂ 14.4-14.7 mm, ♀ 14.9 mm) で黒みが強く, 前翅の白帯は2♂では非常に狭く不明瞭 (1♀では明瞭) であった。これが地理的変異なのか個体変異なのかは現時点では不明。

分布: 琉球 (奄美大島, 沖縄本島, 西表島)。

5. *Nemophora polychorda* (Meyrick) タイワンオオヒゲナガ (日本新記録) (Figs 1I-J, 8, 14A-C)

大型 (開張 15-22 mm)。前翅は黄褐色で横帯は橙黄色。本種は台湾産の個体に基づいて記載された。台湾産はサイズが大きい (開張♂ 25-30 mm) が, 琉球列島産は相対的に小さい。本種は奄美大島と沖縄本島で比較的普通で, ♂はさまざまな樹木の樹冠部やその周辺などで群飛していた。

分布: 琉球 (奄美大島, 沖縄本島); 台湾。

6. *Nemophora magnifica* Kozlov イナズマヒゲナガ (新称, 日本新記録) (Figs 1K-L, 9, 15A-C)

前翅は暗褐色で, 前翅基半部にW型 (イナズマ状), 基部2/3の前・後縁に三角状の淡黄色斑をもつ。中型 (開張 15-16 mm)。全種と同様に, 本種は最初に記載された台湾産 (特に♂: 開張 18-21 mm) に比べて小さい。

分布: 琉球 (石垣島, 西表島); 台湾。

7. *Nemophora optima* (Butler) ギンスジヒゲナガ (琉球列島新記録) (Fig. 1M)

琉球列島から奄美大島で採集された1♀ (開張 12 mm) のみが確認された。前翅, 前・後縁に黒鱗で縁取られた銀色の短条線をもつ。本州産に比べて前翅の地色が濃い。

分布: 北海道, 本州, 九州, 琉球 (奄美大島)。

(Accepted July 1, 2005)